

PATENT COOPERATION TREATY

PCT

03 NOV 2006

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

10/557 096

Applicant's or agent's file reference SK05PCT00014	FOR FURTHER ACTION	See item 4 below
International application No. PCT/JP2005/005371	International filing date (<i>day/month/year</i>) 24 March 2005 (24.03.2005)	Priority date (<i>day/month/year</i>) 06 April 2004 (06.04.2004)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant SONY CORPORATION		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).
2. This REPORT consists of a total of 6 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Date of issuance of this report 19 October 2006 (19.10.2006)
Facsimile No. +41 22 338 82 70	Authorized officer <div style="text-align: center; font-weight: bold;">Masashi Honda</div> e-mail: pt08@wipo.int

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing
(day/month/year)

Applicant's or agent's file reference

SK05PCT00014

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/JP2005/005371

International filing date (day/month/year)

24.03.2005

Priority date (day/month/year)

06.04.2004

International Patent Classification (IPC) or both national classification and IPC

Applicant

SONY CORPORATION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JP

Authorized officer

Facsimile No.

Telephone No.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/005371

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐

This opinion has been established on the basis of a translation from the original language into the following language

_____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐

a sequence listing

☐

table(s) related to the sequence listing

b. format of material

☐

in written format

☐

in computer readable form

c. time of filing/furnishing

☐

contained in the international application as filed.

☐

filed together with the international application in computer readable form.

☐

furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/005371

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-9</u>	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	<u>1-9</u>	NO
Industrial applicability (IA)	Claims	<u>1-9</u>	YES
	Claims		NO

2. Citations and explanations:

- Document 1: GLENTIS et al. "Efficient algorithms for Volterra system identification", IEEE Transactions on Signal Processing, Beikoku, IEEE, published in November 1999, Vol. 47, Issue 11, pp. 3042-3057
- Document 2: JP 2001-525101 A (Koninklijke Philips Electronics N. V.), 04 December 2001, page 4, lines 9-25, Fig. 1 & US 6600794 B1 & WO 1999/041839 A1
- Document 3: MATHEWS, V. J. "Adaptive polynomial filters", Signal Processing Magazine, Beikoku, IEEE, published in July 1991, Vol. 8, Issue 3, pp. 10-26

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/005371

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Table 2 of Par. No. 0005 of the specification describes that "the multiplication factor of the secondary term of formula (13)" is 2, 4, ..., 30 with respect to $M_2 = 1, 2, \dots, 15$, but why the "the multiplication factor of the secondary term of formula (13)" is 2, 4, ..., 30 is unclear.

(Par. No. 0005 of the specification describes that there are 27 "multipliers of the secondary filter portion" in the case of " $M_2 = 6$ ", but this does not match the description of table 2 and is unclear).

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: V.2

Claims 1-4

Document 1 cited in the IRS describes that a secondary filter realizing a secondary term of secondary Volterra filter of a signal processing device using a secondary Volterra filter comprises n (n is integer of 1 or more) multiplication means ("the primary signals") for multiplying the first input signals and second input signals, wherein the k -th multiplication means (k is an integer satisfying the condition: $1 \leq k \leq n$) uses as the second signal a signal obtained by delaying the first signals by a unit time multiplied by a factor of $(k - 1)$ (see page 3042, right column, lines 16-27, page 3044, right column, line 21 to page 3045, right column, line 14, and Fig. 2), the output of the multiplication means is delayed (see page 3044, right column, line 21 to page 3045, right column, page 14 and Fig. 1), delay means are provided that are connected in at least one row connected to the output of multiplication means when the signal outputted from the multiplication means is delayed (see Fig. 2), and a Volterra filter is realized by multiplying the output of the multiplication means and the output of the delay means by coefficients and adding up the outputs obtained.

Furthermore, using a signal processing device employing a secondary Volterra filter as an equalizer for equalizing the input signals as described in document 2 cited in the IRS represents well-known art.

Therefore, configuring a secondary filter for realizing a secondary term of a secondary Volterra filter in a signal processing device using a secondary Volterra filter described in document 1 from a multiplication means for multiplying a first signal and a second signal obtained by delaying the first signal by a unit time multiplied by a factor of $(k - 1)$, delay means that are connected in at least one row connected to the output of multiplication means, a factor multiplication means for multiplying the signal outputted from the multiplication means and the signal outputted from each delay means by a predetermined factor, and an addition means for adding up the outputs of the factor multiplication means, and also employing a secondary Volterra filter as an equalizer for equalizing the input signals could have easily been conceived by a person skilled in the art.

Claims 5-7, 9

As described in document 3 (see page 11, right column, line 35 to page 13, left column, line 16 and Fig. 16) cited in the ISR, configuring a secondary Volterra filter from a primary filter for linear equalization of inputted signals, a secondary filter for non-linear equalization of inputted signals, and signal addition means for adding up the signal outputted from the primary filter and the signal outputted from the secondary filter represents the commonly performed art.

Furthermore, document 2 also describes that a signal decoding circuit is configured by providing an optimum decoding means for optimum decoding of the equalizer output.

Claim 8

As described in document 3 (see page 13, left column, line 16 to page 13, right column, line 45 and Fig. 3), providing an error detection means for detecting the difference between a target signal and a signal in each discrete time of the Volterra filter and updating the coefficient of the Volterra filter for each discrete time based on the error detected with the error detection means, represent well-known art.